

AMENDMENTS TO THE SPECIFICATION

Please replace the paragraphs starting at p. 1, line 14 and ending at p. 2, line 17 with the following paragraphs rewritten in amendment format:

For the first method, a router establishes a multicast group address forwarding table in a ~~level~~layer-3 network equipment by using an Internet Group Management Protocol (IGMP); when a multicast user joins in a multicast group, the router adds the multicast user's forwarding information to the multicast group address forwarding table and deletes the multicast user's forwarding information from the multicast group address forwarding table when the multicast user leaves the multicast group, so as to dynamically manage the multicast user to join or leave the multicast group. Therefore, the multicast services implemented only through the IGMP can only obtain statuses of the multicast user's joining and leaving the multicast group, and not provide management over whether the multicast user is authorized to join in the multicast group, which is unfavorable to the multiple developments of multicast network operator's services.

The second method is to utilize IGMP Snooping techniques to snoop the IGMP packet transferred between multicast users and the ~~level~~layer-3 network equipment, like the router and so on, establish and maintain a ~~level~~layer-2 multicast group address forwarding table in a ~~level~~layer-2 network equipment according to types of IGMP packets, and implement multicast services according to the ~~level~~layer-2 multicast group address forwarding table and the ~~level~~layer-3 multicast group address forwarding table.

As shown in FIG. 1, the multicast user actively initiates an IGMP leaving packet before leaving the multicast group, so as to notify the router to delete the multicast user's address from the levellayer-3 multicast group address forwarding table; the multicast user initiates an IGMP joining packet before joining in the multicast group, so as to notify the router to add the multicast user's address to the levellayer-3 multicast group address forwarding table; while the router is confirming the multicast user's state by sending an IGMP inquiry packet to the multicast user, if the router fails to receive any inquiry response in a certain period of time, it will delete the multicast user's address from the levellayer-3 multicast group address forwarding table. If the multicast user responds an IGMP report packet to the router after receiving the IGMP inquiry packet, the router will decide whether to add the multicast user to the multicast group or establish a new levellayer-3 multicast group address forwarding table according to the multicast group information carried in the IGMP report packet.

IGMP Proxy is similar to IGMP Snooping, but IGMP Proxy terminates the IGMP packets from multicast users and requests upper-~~level~~-layer network equipment for multicast recourses as a proxy of the multicast user.

Please replace the paragraph starting at p. 2, line 25 and ending at p. 3, line 3 with the following paragraph rewritten in amendment format:

Firstly, ACL is preset for multicast users who are authorized to use multicast services. For instance, address information 10.10.10.10/24 is set in ACL, and the multicast user whose source IP address is 10.10.10.10/24 can access any multicast group. Secondly, the levellayer-2 network equipment processes the IGMP packet sent

by the multicast user by IGMP Snooping technique or IGMP Proxy technique and compares the multicast user's source IP address with the address in ACL. If the multicast user's source IP address matches the address in the ACL, the multicast user is authorized to join in any multicast group; if the user's source IP address doesn't match the address in the ACL, the multicast user is ~~rejected~~ prohibited from joining any multicast group.

Please replace the paragraph starting at p. 3, line 16 and ending at p. 3, line 2 with the following paragraph rewritten in amendment format:

B. a request packet sent by the multicast user who requests to join in the multicast group is obtained; according to the multicast user address and multicast group address carried in the request packet, it is determined whether the multicast group address in the request packet matches corresponding multicast group address of the multicast user among the mapping relation preset in step A, if yes, the multicast user is permitted to join in the multicast group, otherwise, the multicast user is ~~rejected~~ prohibited from joining in the multicast group.

Please replace the paragraphs starting at p. 3, line 26 and ending at p. 4, line 9 with the following paragraphs rewritten in amendment format:

The step of determining whether the multicast group address in the request packet matches the corresponding multicast group address of the multicast user among the mapping relation preset in step A, further includes: it is determined whether the multicast group address in the request packet corresponds to the multicast authority; if

yes, whether the multicast group address in the request packet matches that corresponding to the multicast authority is determined; if yes, the multicast user is permitted to join in the multicast group, otherwise the multicast user is ~~rejected~~ prohibited from joining in the multicast group; if the multicast group address in the request packet corresponds to no multicast authority, the multicast user is ~~rejected~~ prohibited from joining in the multicast group.

If the multicast group address in the request packet corresponds to no multicast authority in step B, whether the multicast user is a super user is determined; if yes, the multicast user is permitted to join in the multicast group, otherwise the multicast user is ~~rejected~~ prohibited from joining in the multicast group.

Please replace the paragraphs starting at p. 4, line 15 and ending at p. 4, line 22 with the following paragraphs rewritten in amendment format:

The multicast user address includes a frame number, a slot number and a port number of a ~~level~~layer-2 network equipment to which the multicast user is connected; or the multicast user address includes a frame number, a slot number, a port number, a Virtual LAN (VLAN) identifier and an IP address of a ~~level~~layer-3 network equipment to which the multicast user is connected.

The ~~level~~layer-2 network equipment is Digital Subscriber Line (DSL) broadband access equipment or a Local Area Network (LAN) switcher; the ~~level~~layer-3 network equipment is a router or a ~~level~~layer-3 switcher.

Please replace the paragraph starting at p. 4, line 26 and ending at p. 4, line 29 with the following paragraph rewritten in amendment format:

The request packet sent by the multicast user who requests to join in the multicast group is obtained as follows: an IGMP Proxy terminates the request packet and requests ~~upper-level~~layer network equipment for multicast resources as a proxy of the multicast user.

Please replace the paragraphs starting at p. 5, line 28 and ending at p. 6, line 26 with the following paragraphs rewritten in amendment format:

Definition of the multicast user depends on specific location information of the connection between the multicast user and the network equipment; as to the network equipment, location information can be taken as address information of the multicast user. For instance, as to the ~~level~~layer-2 network equipment such as a Digital Subscriber Line (DSL) broadband access equipment, and a LAN SWITCH, the frame number, slot number and port number of the ~~level~~layer-2 network equipment can be taken as address information of a multicast user because multicast users can be identified according to the frame number, slot number and port number of the connected equipment; as to the ~~level~~layer-3 network equipment like the router, the frame number, slot number, port number, VLAN ID and IP address of the level-3 network equipment can be taken as address information of a multicast user because multicast users can be identified according to the frame number, slot number, port number and VLAN ID of the connected equipment. It should be specially mentioned that, when a plurality of multicast users are connected to the ~~level~~layer-2 network equipment that is connected

to a certain frame, slot, or port of the layer-3 network equipment, it must be guaranteed that each multicast user uses a unique VLAN ID.

Since there are a number of multicast group addresses as well as a number of multicast users, some multicast group addresses can be accessed by all multicast users while some multicast group addresses can only be accessed by specific multicast users. In order to manage the variational multicast users and multicast group addresses better, the preferable way is to establish the mapping relation between multicast users and multicast addresses by setting multicast authorities, namely respectively establishing mapping relations between multicast addresses and multicast authorities as well as mapping relations between multicast authorities and multicast users, and some other properties can be set in the multicast authority, such as time limitation of multicast program that can be obtained by the multicast user. These mapping relations can be stored in the layer-3 network equipment or the layer-2 network equipment.

Please replace the paragraph starting at p. 7, line 30 and ending at p. 8, line 9 with the following paragraph rewritten in amendment format:

Based on the above setting, when the multicast user joins in a certain multicast group to utilize the multicast services, the multicast user should be processed according to the above setting. The specific method is: when the multicast user wants to join in a certain multicast group to utilize the multicast services, the multicast user sends a request packet that includes an IGMP-based request packet. The layer-2 network equipment or layer-3 network equipment can obtain the request packet sent by the

multicast user by way of IGMP Proxy technique or IGMP Snooping technique. After obtaining the request packet, the network equipment can determine whether the multicast user is authorized to utilize the multicast service according to information carried in the request packet.

Please replace the paragraphs starting at p. 8, line 12 and ending at p. 9, line 8 with the following paragraphs rewritten in amendment format:

Step 300: the levellayer-2/levellayer-3 network equipment utilizes IGMP Proxy technique or IGMP Snooping technique to snoop the IGMP-based request packet sent by the multicast user; when the IGMP-based request packet sent by the multicast user is snooped, execute step 310; determine the multicast user's address information according to the VLAN ID carried in this request packet and/or the frame number, slot number, port number and IP address from which the request packet is sent.

Step 320: determine whether the multicast user corresponds to a multicast authority according to the mapping relation between address information of the multicast users and multicast authorities. If this multicast user does not correspond to any multicast authority, execute step 321 to determine whether the multicast user is a super user according to the multicast user's address information carried in the request packet; if the multicast user is a super user, execute step 340 to permit the user's using the requested multicast service, namely, adding the multicast user to the multicast address forwarding list and forwarding the multicast service stream according to the forwarding list. If the multicast user is not a super user according to the multicast user's address information carried in the request packet, execute step 350 to ~~reject~~prohibit the

multicast user from using the current requested service, namely ~~rejecting to~~prohibit adding the multicast user to the multicast address forwarding list, so that the multicast service stream will not be forwarded to the multicast user because the multicast user information is not included in the forwarding list.

In step 320, if it is determined that the multicast user corresponds to a multicast authority according to the mapping relation between the multicast user's address information and multicast authorities, execute step 330. Determine whether the multicast group address carried in the request packet matches the multicast group address in the mapping relation according to the mapping relation between multicast authorities and multicast group addresses; if yes, execute step 340 to permit the multicast user to use the current requested multicast service; otherwise, execute step 350 to ~~reject~~prohibit the multicast user from using the current requested multicast service.